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From: Officer in Charge, Naval Sea Systems Command Detachment,  
Radiological Affairs Support Office (RASO)  
To: Environmental Management Branch, Department of Health  
Services, (Attn: Deirdre Dement)  
Subj: RELEASE OF BUILDING 821, PARCEL A AT HUNTERS POINT  
SHIPYARD  
Encl: (1) Radiological Survey Data of Building 821, Parcel A at  
Hunters Point Shipyard

1. Enclosure (1) is provided for your review regarding the radiological survey performed at Building 821, Parcel A at Hunters Point Shipyard, San Francisco, California. This survey was performed due to increased regulator and public concern over this building.

2. Building 821 is a two story concrete building formerly used by the Naval Radiological Defense Laboratory (NRDL) as an x-ray facility. Machine producing ionizing radiation was used in the building to conduct irradiation experiments. There is no historical documentation of the use of radioactive material in the building. The building is currently unoccupied and secured. There is no history that this building was leased or used during the period of NRDL's closure to the present.

3. NAVSEADET RASO has reviewed the information and recommends that this building is suitable for unrestricted release. Please review this information and provide written concurrence by June 24, 2002.

4. NAVSEADET RASO point of contact is CDR Vincent DeInnocentiis at commercial (757) 887-4692 or commercial fax (757) 887-3235.

  
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RADIOLOGICAL SURVEY OF BUILDING 821

PARCEL A

HUNTERS POINT SHIPYARD

SAN FRANCISCO, CALIFORNIA

ENCLOSURE (1)

## **1.0 INTRODUCTION**

This report documents the radiological survey of Building 821 at Hunters Point Shipyard (HPS) in San Francisco, California. New World Technology (NWT) carried out the fieldwork under contract to the U.S. Army Operations Support Command in Rock Island, Illinois. NWT was contracted on behalf of the Southwest Division of the U.S. Naval Facilities Engineering Command, with support for the radiological survey provided by the Naval Sea Systems Command Detachment, Radiological Affairs Support Office (RASO), in Yorktown, Virginia.

All surveys were completed in accordance with the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)(EPA 2001).

Building 821 is a two-story, concrete building located in Parcel A. Historically, this building has no record of any use with radioactive material. The building was used as by NRDL as an x-ray facility. Machine producing ionizing radiation was used in the building to conduct irradiation experiments. The building is currently unoccupied and has no history of any occupation since the closing of NRDL in 1969.

## **2.0 DESCRIPTION OF SURVEY UNIT**

Building 821 was segregated into two survey units, 1) Survey Unit 1(821RM1): This unit consists of the control room for the x-ray machine and 2) Survey Unit 2 (821RM2): This unit consists of the exposure room housing the x-ray unit.

## **3.0 RADIONUCLIDES OF CONCERN**

Historical research indicated that Building 821 had no potential to become contaminated from the Naval Radiological Defense Laboratory (NRDL) operations. The instrumentation used in the survey is capable of detecting gamma, alpha and beta emitting radionuclides. There is no contaminant of concern associated with building 821.

## **4.0 INSTRUMENTATION**

The following sections describe the instrumentation selected for the survey.

#### **4.1 GAMMA RADIATION SCANS AND STATIC MEASUREMENTS**

Gamma radiation was investigated using a Ludlum Model 44-10 sodium iodide (NaI) 2 inch by 2-inch scintillation detector and Ludlum Model 2350-1 Data Logger. The Ludlum Model 44-10 contains a NaI crystal and detects gamma radiation with energies that range from 60 kiloelectron volts (keV) to 3 mega-electron volts (MeV).

The NaI detector was used for both gamma scans and static (fixed) measurements. Scans and static measurements detect general area radiation. The data loggers were set-up to respond to gamma energy in the full range of the instrument (60 keV to 3 MeV).

Measurements from surface scans were recorded instantaneously from the digital readout meters. Static measurements were recorded after holding the probe at the survey location for a period of one-minute. Both results are reported in counts per minute (cpm).

#### **4.2 STATIC (FIXED) MEASUREMENTS OF ALPHA AND BETA RADIATION**

Static measurements of alpha and beta radiation were obtained using a Ludlum Model 43-68 large area (126 square centimeters) gas probe and a Ludlum Model 2360 Data Logger.

#### **4.3 EXPOSURE RATE SURVEYS**

Exposure rates were measured using a Ludlum Model 19 NaI scintillation microRoentgens ( $\mu\text{R}$ ) meter.

#### **4.4 SWIPE SAMPLING FOR GROSS ALPHA AND BETA RADIATION**

Swipe samples were collected for analysis of removable alpha and beta contamination activity. Samples were analyzed using the Protean IPC 9025 swipe counter. The Protean IPC 9025 is a very low background, gas flow proportional alpha/beta radiation counter. A microprocessor allows data processing, and this unit provides a full range of simultaneous alpha and beta counting at the levels required for environmental release surveys. Data is reported in units of disintegration per minute (dpm) per 100 square centimeters ( $\text{cm}^2$ ).

## **5.0 METHODOLOGY**

This section describes the methodologies used in this radiological investigation.

### **5.1 DESIGN OF MARSSIM SURVEY**

Building 821 was designated as MARSSIM Class 1 due to an initial sediment sample from the control room deck drain that was above the EPA PRG for cesium-137 of 0.13 pCi/g. Scan surveys were conducted over 100 percent of each room, biased to include likely collection points, such as low-lying and recessed areas and places where drains exist or would have been in service when the building was used for operations involving radioactive material.

The number of data points required for each survey was chosen through statistical analysis based on MARSSIM guidance. Based on Cesium-137 as the most prevalent radionuclide encountered at HPS, the statistical analysis resulted in a relative shift of 1.7. The relative shift is an expression of the resolution of the measurements in units of measurement uncertainty. Using the relative shift and a 95 percent confidence level of detection, Table 5.3 in MARSSIM indicates a minimum of 15 data points for each survey unit and reference area.

### **5.2 INSTRUMENT CALIBRATION**

The instruments and systems were calibrated using the manufacturer's protocol to a source traceable to the National Institute of Standards and Technology. Daily radioactive source readings were collected for consistency and to verify proper operation of detectors and detection systems.

### **5.3 CALCULATION OF BACKGROUND RADIATION**

Background was established using a building that is as similar as possible to the survey unit. In this case Building 258, Parcel C was chosen as the background area. Building 258 is a non-impacted building; historically this building has no record of operations involving radioactive materials. Building 258 is a concrete and metal building that is currently not in use and was formerly used for pipe manufacturer. This building contains an area that its size and description (concrete walls and floor) is very similar to Building 821. Although Building 258 was not built in the same year as Building 821 or that the building material used to build these

two buildings comes from the same area, the similarity to each other was sufficient for use as a background area.

Background data were established by collecting static 1-minute gamma and 5-minute measurements of alpha and beta radiation. Gamma readings were collected 4 inches above the ground, and surface contact measurements for alpha and beta emissions used a 126-cm<sup>2</sup> probe in contact with the surface. Exposure rates were established by taking readings at waist height. Measurements were taken at 16 random locations over the entire building. The mean values for these measurements are the background levels for comparison with the data acquired from the survey units.

#### **5.4 DATA COLLECTION**

Building 821 was assessed using a multi-step process. Data collection teams consisted of a senior health physics technician and a junior health physics technician. Each of the steps presented below were conducted in sequential order, but independent of other steps. Any anomalies went through a thorough validation process described later in this document.

#### **5.5 SURFACE GAMMA SCAN**

A surface, or walkover, gamma scan was completed over 100 percent area of the building. Ground surfaces, structures, and walls up to 1 meter were scanned at a 2 second interval with the detector within 4 inches from the surface. Any areas where activities were measured above the levels specified for the gamma investigation were designated as one of the 16 discrete locations for subsequent sampling. Remaining discrete locations were randomly chosen.

Any data point that exceeded the established mean background plus 3 standard deviations of the mean was considered to exceed the investigation level.

#### **5.6 STATIC SCANS FOR FIXED CONTAMINATION**

Static 5-minute measurements for alpha and beta emitters and static 1-minute measurements of gamma radiation were collected from the 16 discrete locations to survey for total (fixed and removable) contamination.

## **5.7 EXPOSURE RATE SURVEY**

Exposure rates for gamma radiation were also measured at waist level at the 16 discrete locations.

## **5.8 SWIPE SAMPLES FOR REMOVABLE CONTAMINATION**

Swipe samples are collected on areas with permanent surfaces for the survey unit. Swipe samples that covered a 100 cm<sup>2</sup> area for analysis of gross alpha and beta were collected to detect removable contamination. Separate swipe samples were collected from all of the 16 discrete locations. Samples collected for analysis of gross alpha and beta emitters were on cloth disc media.

## **5.9 DATA ANALYSIS**

Data from surveys were evaluated by screening against the investigation levels. Basic statistical quantities were also calculated for the data to identify patterns, relationships, and any type anomaly.

## **5.10 SCREENING LEVELS**

A value of background plus three (3) sigma was established as the screening level at which point further investigation of a potential elevated reading would be initiated. This screening level was applied generically to all survey units based on the appropriate reference data.

## **6.0 RESULTS OF SURVEY**

The survey data is attached in Appendix A.

**6.1 GAMMA SCANS:** No locations exceeded the levels established for the gamma investigation during the surface gamma scan and discrete locations for direct measurement and swipe sampling were randomly selected.

**6.2 FIXED ALPHA/BETA MEASUREMENTS:** No results for any of the locations exceeded the fixed alpha or beta background or the investigation level.



**6.3 FIXED GAMMA MEASUREMENTS:** No results from any of the locations exceeded the fixed gamma investigation level. Based on this data there is no need for further investigation due to the fixed gamma results.

**6.4 EXPOSURE RATE MEASUREMENTS:** Exposure rate measurements for both survey units are within background.

**6.5 SWIPE DATA AND ANALYSIS:** All alpha and beta swipes were less than the MDA for the instrumentation.

**6.6 GAMMA SPECTROSCOPY RESULTS:** Two sediment samples were taken from each deck drain in each survey unit. Sample 821 S-1 show cesium-137 levels above the EPA PRG of 0.13 pCi/g. Sample 821 S-2 results were less than the systems MDA. Sample 821 S-1 was sent out to an independent laboratory for validation of the results. The results from the independent laboratory, Eberline showed that the level for cesium-137 for the sample 821 S-1 was 0.08 pCi/g, below the EPA PRG. Upon review of the data, it was discovered that the original sample was analyzed with less than the normal volume of sample (124 grams vice 1000 grams) and the on-site laboratory failed to make the proper adjustments to the system to account for the lesser volume. This oversight over-estimated the activity in the sample. This was verified by the independent laboratory's analysis.

## **7.0 CONCLUSION**

The survey data met the investigation levels indicating no further action required. Although there is no radionuclide of concern and therefore no release criteria, this data was compared to background. Statistical tests for normality and the comparison of the average means (t test) from the background and survey units were performed. The survey units passed the normality test, however six of the eight data sets failed the t test. The t test showed that the difference in the median values between the two groups (background and the survey unit) was greater than would be expected by chance; there was a statistically significant difference. This would indicate that either the wrong background was chosen or there is a potential for contamination. Due to the historical information of this building and the radiological levels acquired during the survey, this would indicate that the background area is not comparable. As previously stated in section 5.3, it was difficult to find a building that is exactly the same as the survey unit. This statistical difference is attributed to the variation in the naturally occurring radioactive material in the building materials used in the construction of these two buildings.

Therefore it is recommend no further action is required in Building 821 and that it may be released for unrestricted use.

APPENDIX A  
SURVEY DATA FOR BUILDING 821



## 2360 Location Specific Backgrounds

NWT GA00467 Hunters Point , Ca.

Location Code **258Z023**      Description **258 Background (168023)**      Count Time **5**

Detector ID **168023**

Alpha:

Average CPM: 1.91

STDEV CPM: 0.61

Average DPM: 29.37

STDEV DPM: 9.34

Min DPM: 9.23

Max DPM: 46.15

Beta:

Average CPM: 216.55

STDEV CPM: 25.06

Average DPM: 1,628.23

STDEV DPM: 188.40

Min DPM: 1,460.15

Max DPM: 2,187.97

SN	Date	Time	A CPM	A EFF	A DPM	B CPM	B EFF	B DPM
0001	06/07/02	11:25:13	1.40	.065	21.54	207.60	.133	1,561
0002	06/07/02	11:30:55	2.80	.065	43.08	226.80	.133	1,705
0003	06/07/02	11:36:27	1.80	.065	27.69	206.20	.133	1,550
0004	06/07/02	11:41:53	1.80	.065	27.69	201.00	.133	1,511
0005	06/07/02	11:47:24	2.20	.065	33.85	196.40	.133	1,477
0006	06/07/02	11:53:35	1.80	.065	27.69	209.20	.133	1,573
0007	06/07/02	12:00:40	2.00	.065	30.77	229.20	.133	1,723
0008	06/07/02	12:07:17	1.80	.065	27.69	197.00	.133	1,481
0009	06/07/02	12:12:36	1.60	.065	24.62	211.60	.133	1,591
0010	06/07/02	12:18:08	3.00	.065	46.15	291.00	.133	2,188
0011	06/07/02	12:23:19	2.40	.065	36.92	204.60	.133	1,538
0012	06/07/02	12:28:52	2.20	.065	33.85	216.60	.133	1,629
0013	06/07/02	12:34:42	0.80	.065	12.31	201.20	.133	1,513
0014	06/07/02	12:40:00	2.40	.065	36.92	207.80	.133	1,562
0015	06/07/02	12:45:36	2.20	.065	33.85	265.00	.133	1,992
0016	06/07/02	12:51:26	2.20	.065	33.85	201.20	.133	1,513
0017	06/07/02	12:56:39	1.80	.065	27.69	194.20	.133	1,460
0018	06/07/02	13:02:06	2.80	.065	43.08	244.20	.133	1,836
0019	06/07/02	13:07:18	1.20	.065	18.46	204.20	.133	1,535
0020	06/07/02	13:12:42	1.80	.065	27.69	197.40	.133	1,484
0021	06/07/02	13:18:00	0.60	.065	9.23	249.20	.133	1,874
0022	06/07/02	13:23:28	1.40	.065	21.54	202.60	.133	1,523



NWT GA00467 Hunters Point , Ca.

BKG Location: <u>258Z023</u>	$\alpha$	Avg. DPM BKG: <u>29.37</u>	Alpha: <u>        </u>	Beta: <u>        </u>
$\alpha$ 3 Sigma: <u>57.39</u>	$\beta$	Avg DPM BKG: <u>1,628.23</u>	Average DPM: <u>6.91</u>	Average DPM: <u>201.59</u>
$\beta$ 3 Sigma: <u>2,193.44</u>	$\alpha$	StDev DPM BKG: <u>9.34</u>	STDEV: <u>0.60</u>	STDEV: <u>12.69</u>
	$\beta$	StDev DPM BKG: <u>188.40</u>	Alpha MDC: <u>23.02</u>	Beta MDC: <u>85.25</u>

\* = DPM value is greater than 1 Sigma  
 \*\* = DPM value is greater than 2 Sigma  
 \*\*\* = DPM value is greater than 3 Sigma



## 2360 Location Specific Backgrounds

NWT GA00467 Hunters Point , Ca.

Location Code **258Z685** Description **258 Background (164685)** Count Time **5**

Detector ID **164685**

Alpha:

Average CPM: 6.49

Min DPM: 62.69

STDEV CPM: 1.39

Average DPM: 96.87

STDEV DPM: 20.71

Beta:

Average CPM: 181.46

Min DPM: 1,225.90

STDEV CPM: 6.61

Max DPM: 1,388.49

Average DPM: 1,305.47

STDEV DPM: 47.55

SN	Date	Time	A CPM	A EFF	A DPM	B CPM	B EFF	B DPM
0001	06/07/02	11:34:27	6.00	.067	89.55	171.80	.139	1,236
0002	06/07/02	11:39:54	6.60	.067	98.51	189.80	.139	1,365
0003	06/07/02	11:45:26	5.40	.067	80.60	178.60	.139	1,285
0004	06/07/02	11:51:01	6.00	.067	89.55	193.00	.139	1,388
0005	06/07/02	11:56:36	6.60	.067	98.51	173.80	.139	1,250
0006	06/07/02	12:01:51	6.40	.067	95.52	170.80	.139	1,229
0007	06/07/02	12:07:34	9.20	.067	137.31	184.80	.139	1,329
0008	06/07/02	12:13:28	4.20	.067	62.69	187.00	.139	1,345
0009	06/07/02	12:19:18	6.00	.067	89.55	178.60	.139	1,285
0010	06/07/02	12:24:57	5.60	.067	83.58	187.80	.139	1,351
0011	06/07/02	12:30:20	6.00	.067	89.55	182.80	.139	1,315
0012	06/07/02	12:35:46	6.20	.067	92.54	184.80	.139	1,329
0013	06/07/02	12:41:09	6.00	.067	89.55	187.20	.139	1,347
0014	06/07/02	12:46:24	6.20	.067	92.54	181.40	.139	1,305
0015	06/07/02	12:51:45	7.20	.067	107.46	184.80	.139	1,329
0016	06/07/02	12:57:24	5.20	.067	77.61	183.20	.139	1,318
0017	06/07/02	13:02:38	5.60	.067	83.58	186.20	.139	1,340
0018	06/07/02	13:07:52	6.60	.067	98.51	175.00	.139	1,259
0019	06/07/02	13:13:13	8.80	.067	131.34	170.40	.139	1,226
0020	06/07/02	13:18:32	10.00	.067	149.25	177.40	.139	1,276



# Alpha / Beta Direct Measurement Report

(Results given in DPM/100cm<sup>2</sup>)

NWT GA00467 Hunters Point, Ca.

Location Code: 821A1B Description: 821A1 Room 2 Count Time: 5 min.  
Detector ID: 164685 Cal Due Date: 2/14/2003 Technician: Steve Palko  
Model: 2360 Detector: 43-68 (Gas Proportional)

BKG Location: 258Z685  $\alpha$  Avg. DPM BKG: 96.87 Alpha:            Beta:             
 $\alpha$  3 Sigma: 159.01  $\beta$  Avg DPM BKG: 1,305.47 Average DPM: 20.26 Average DPM: 171.81  
 $\beta$  3 Sigma: 1,448.10  $\alpha$  StDev DPM BKG: 20.71 STDEV: 1.39 STDEV: 8.29  
 $\beta$  StDev DPM BKG: 47.55 Alpha MDC: 35.17 Beta MDC: 74.96

SN	Date	Time	A CPM	Net A CPM	A EFF	A DPM	B CPM	Net B CPM	B EFF	B DPM
1	06/05/02	10:18:23	7.40	0.91	.067	11	204.20	22.74	.139	130
2	06/05/02	10:23:51	9.80	3.31	.067	39	210.40	28.94	.139	165
3	06/05/02	10:29:57	10.40	3.91	.067	46	213.60	32.14	.139	184
4	06/05/02	10:35:22	6.80	0.31	.067	4	215.60	34.14	.139	195
5	06/05/02	10:40:43	7.80	1.31	.067	16	205.20	23.74	.139	136
6	06/05/02	10:46:20	9.20	2.71	.067	32	214.20	32.74	.139	187
7	06/05/02	10:53:11	7.00	0.51	.067	6	213.00	31.54	.139	180
8	06/05/02	10:58:44	7.80	1.31	.067	16	213.20	31.74	.139	181
9	06/05/02	11:04:38	7.00	0.51	.067	6	213.80	32.34	.139	185
10	06/05/02	11:10:02	9.20	2.71	.067	32	199.40	17.94	.139	102
11	06/05/02	11:15:40	8.80	2.31	.067	27	232.40	50.94	.139	291
12	06/05/02	11:23:26	7.60	1.11	.067	13	218.60	37.14	.139	212
13	06/05/02	11:28:59	8.80	2.31	.067	27	207.60	26.14	.139	149
14	06/05/02	11:34:16	5.80	-0.69	.067	-8	218.60	37.14	.139	212
15	06/05/02	11:39:57	10.60	4.11	.067	49	206.80	25.34	.139	145
16	06/05/02	11:45:18	7.20	0.71	.067	8	198.20	16.74	.139	96

\* = DPM value is greater than 1 Sigma

\*\* = DPM value is greater than 2 Sigma

\*\*\* = DPM value is greater than 3 Sigma

Monday, June 10, 2002

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# Location Specific Backgrounds - Gamma

NWT GA00467 Hunters Point , Ca.

Location Code: 258Z

Description: 258 Background

Technician: Brian Cheeks

Detector Setup: 1

BKG StDev: 255.56

Avg BKG CPM: 6935.06

BKG 3 Sigma: 7701.75

Instrument ID 98647

Model: 2350-1

Detector: 44-10 (2X2 NaI)

Minimum Count 6,582.0

Maximum Count 7,526.0

SN	Month	Day	Hour	Minute	Counts	Count Time	CPM	Location Code
1	6	7	10	0	6642	1	6642	258Z
2	6	7	10	1	6582	1	6582	258Z
3	6	7	10	3	7118	1	7118	258Z
4	6	7	10	4	7053	1	7053	258Z
5	6	7	10	6	6806	1	6806	258Z
6	6	7	10	7	6721	1	6721	258Z
7	6	7	10	9	7526	1	7526	258Z
8	7	7	10	10	7158	1	7158	258Z
9	7	7	10	12	6707	1	6707	258Z
10	7	7	10	14	7192	1	7192	258Z
11	6	7	10	15	6765	1	6765	258Z
12	6	7	10	16	6795	1	6795	258Z
13	6	7	10	18	7200	1	7200	258Z
14	6	7	10	20	6820	1	6820	258Z
15	6	7	10	21	7010	1	7010	258Z
16	6	7	10	23	6866	1	6866	258Z



# Gamma Direct Measurement Report

NWT GA00467 Hunters Point, Ca.

Location Code: <u>821RM1</u>	BKG Location: <u>258Z</u>	Instrument ID: <u>98647</u>
Description: <u>Building 821 Room 1</u>	BKG StDev: <u>255.56</u>	Model: <u>2350-1</u>
Technician: <u>Brian Checks</u>	Avg BKG CPM <u>6935.06</u>	Detector: <u>44-10 (2X2 NaI)</u>
Detector Setup: <u>1</u>	BKG 3 Sigma: <u>7701.75</u>	Cal Due Date: <u>7/21/02</u>

Average Counts <u>6,582.44</u>	Minimum Count <u>5,698.0</u>
StDev <u>477.11</u>	Maximum Count: <u>7,470.0</u>

SN	Date	Time	Counts	Count Time	CPM	Net CPM
1	6 - 4 - 2002	11 : 38	6087	1 min.	6087	-848
2	6 - 4 - 2002	11 : 39	6927	1 min.	6927	-8
3	6 - 4 - 2002	11 : 40	7023	1 min.	7023	88
4	6 - 4 - 2002	11 : 42	7173	1 min.	7173	238
5	6 - 4 - 2002	11 : 44	7470	1 min.	7470	535 * *
6	6 - 4 - 2002	11 : 45	6716	1 min.	6716	-219
7	6 - 4 - 2002	11 : 47	6349	1 min.	6349	-586
8	6 - 4 - 2002	11 : 49	6674	1 min.	6674	-261
9	6 - 4 - 2002	11 : 51	6732	1 min.	6732	-203
10	6 - 4 - 2002	11 : 52	6745	1 min.	6745	-190
11	6 - 4 - 2002	11 : 53	6695	1 min.	6695	-240
12	6 - 4 - 2002	11 : 55	6509	1 min.	6509	-426
13	6 - 4 - 2002	11 : 56	6571	1 min.	6571	-364
14	6 - 4 - 2002	11 : 58	5698	1 min.	5698	-1,237
15	6 - 4 - 2002	11 : 59	5814	1 min.	5814	-1,121
16	6 - 4 - 2002	12 : 0	6136	1 min.	6136	-799

Detector Setup 1 = Ra226, 2 = Cs137

\* = CPM exceeds 1 Sigma

\*\* = CPM exceeds 2 Sigma

\*\*\* = CPM exceeds 3 Sigma

Friday, June 07, 2002

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# Gamma Direct Measurement Report

NWT GA00467 Hunters Point , Ca.

Location Code: 821RM2

Description: Building 821 Room 2

Technician: Brian Checks

Detector Setup: 1

BKG Location: 258Z

BKG StDev: 255.56

Avg BKG CPM 6935.06

BKG 3 Sigma: 7701.75

Instrument ID: 98647

Model: 2350-1

Detector: 44-10 (2X2 NaI)

Cal Due Date: 7/21/02

Average Counts 7,070.25

Minimum Count 6,303.0

StDev 255.40

Maximum Count: 7,488.0

SN	Date	Time	Counts	Count Time	CPM	Net CPM
1	6 - 4 - 2002	12 : 3	6303	1 min.	6303	-632
2	6 - 4 - 2002	12 : 5	7081	1 min.	7081	146
3	6 - 4 - 2002	12 : 6	7103	1 min.	7103	168
4	6 - 4 - 2002	12 : 7	7011	1 min.	7011	76
5	6 - 4 - 2002	12 : 9	7488	1 min.	7488	553 * *
6	6 - 4 - 2002	12 : 10	6843	1 min.	6843	-92
7	6 - 4 - 2002	12 : 11	7158	1 min.	7158	223
8	6 - 4 - 2002	12 : 13	6956	1 min.	6956	21
9	6 - 4 - 2002	12 : 15	7160	1 min.	7160	225
10	6 - 4 - 2002	12 : 17	7062	1 min.	7062	127
11	6 - 4 - 2002	12 : 18	7243	1 min.	7243	308 *
12	6 - 4 - 2002	12 : 20	7138	1 min.	7138	203
13	6 - 4 - 2002	12 : 21	6960	1 min.	6960	25
14	6 - 4 - 2002	12 : 22	7153	1 min.	7153	218
15	6 - 4 - 2002	12 : 24	7342	1 min.	7342	407 *
16	6 - 4 - 2002	12 : 25	7123	1 min.	7123	188

Detector Setup 1 = Ra226, 2 = Cs137

\*= CPM exceeds 1 Sigma

\*\*= CPM exceeds 2 Sigma

\*\*\*= CPM exceeds 3 Sigma

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# Location Specific Backgrounds - Gamma

NWT GA00467 Hunters Point , Ca.

Location Code: 258Z

Description: 258 Background

Technician: Brian Cheeks

Detector Setup: 1

BKG StDev: 237.72

Avg BKG CPM: 6647.00

BKG 3 Sigma: 7360.15

Instrument ID 117578

Model: 2350-1

Detector: 44-10 (2X2 NaI)

Minimum Count 6,291.0

Maximum Count 7,090.0

SN	Month	Day	Hour	Minute	Counts	Count Time	CPM	Location Code
1	6	7	13	0	6381	1	6381	258Z
2	6	7	13	2	6291	1	6291	258Z
3	6	7	13	3	6985	1	6985	258Z
4	6	7	13	5	6567	1	6567	258Z
5	6	7	13	6	6611	1	6611	258Z
6	6	7	13	8	6384	1	6384	258Z
7	7	7	13	10	7015	1	7015	258Z
8	7	7	13	11	6688	1	6688	258Z
9	7	7	13	12	6541	1	6541	258Z
10	7	7	13	14	6915	1	6915	258Z
11	6	7	13	16	6663	1	6663	258Z
12	6	7	13	17	6527	1	6527	258Z
13	6	7	13	19	7090	1	7090	258Z
14	6	7	13	20	6500	1	6500	258Z
15	6	7	13	22	6571	1	6571	258Z
16	6	7	13	23	6623	1	6623	258Z



# Gamma Direct Measurement Report

NWT GA00467 Hunters Point, Ca.

Location Code: 821RM1

Description: Building 821 Room 1

Technician: Brian Cheeks

Detector Setup: 1

BKG Location: 258Z

BKG StDev: 237.72

Avg BKG CPM 6647.00

BKG 3 Sigma: 7360.15

Instrument ID: 117578

Model: 2350-1

Detector: 44-10 (2X2 NaI)

Cal Due Date: 7/21/02

Average Counts 6,260.56

Minimum Count 5,184.0

StDev 538.85

Maximum Count: 7,230.0

SN	Date	Time	Counts	Count Time	CPM	Net CPM
1	6 - 4 - 2002	14 : 38	5770	1 min.	5770	-877
2	6 - 4 - 2002	14 : 39	6465	1 min.	6465	-182
3	6 - 4 - 2002	14 : 41	6743	1 min.	6743	96
4	6 - 4 - 2002	14 : 43	6984	1 min.	6984	337 *
5	6 - 4 - 2002	14 : 44	7230	1 min.	7230	583 * *
6	6 - 4 - 2002	14 : 46	6488	1 min.	6488	-159
7	6 - 4 - 2002	14 : 47	6252	1 min.	6252	-395
8	6 - 4 - 2002	14 : 48	6466	1 min.	6466	-181
9	6 - 4 - 2002	14 : 51	6276	1 min.	6276	-371
10	6 - 4 - 2002	14 : 52	6474	1 min.	6474	-173
11	6 - 4 - 2002	14 : 54	6423	1 min.	6423	-224
12	6 - 4 - 2002	14 : 55	6174	1 min.	6174	-473
13	6 - 4 - 2002	14 : 57	6156	1 min.	6156	-491
14	6 - 4 - 2002	14 : 58	5184	1 min.	5184	-1,463
15	6 - 4 - 2002	14 : 59	5523	1 min.	5523	-1,124
16	6 - 4 - 2002	15 : 1	5561	1 min.	5561	-1,086

Detector Setup 1 = Ra226, 2 = Cs137

\*= CPM exceeds 1 Sigma

\*\*= CPM exceeds 2 Sigma

\*\*\*= CPM exceeds 3 Sigma

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# Gamma Direct Measurement Report

NWT GA00467 Hunters Point , Ca.

Location Code: 821RM2

Description: Building 821 Room 2

Technician: Brian Checks

Detector Setup: 1

BKG Location: 258Z

BKG StDev: 237.72

Avg BKG CPM 6647.00

BKG 3 Sigma: 7360.15

Instrument ID: 117578

Model: 2350-1

Detector: 44-10 (2X2 NaI)

Cal Due Date: 7/21/02

Average Counts 6,691.44

Minimum Count 6,072.0

StDev 194.26

Maximum Count: 6,924.0

SN	Date	Time	Counts	Count Time	CPM	Net CPM
1	6 - 4 - 2002	15 : 3	6072	1 min.	6072	-575
2	6 - 4 - 2002	15 : 5	6746	1 min.	6746	99
3	6 - 4 - 2002	15 : 7	6681	1 min.	6681	34
4	6 - 4 - 2002	15 : 8	6741	1 min.	6741	94
5	6 - 4 - 2002	15 : 9	6911	1 min.	6911	264 *
6	6 - 4 - 2002	15 : 11	6583	1 min.	6583	-64
7	6 - 4 - 2002	15 : 12	6698	1 min.	6698	51
8	6 - 4 - 2002	15 : 15	6598	1 min.	6598	-49
9	6 - 4 - 2002	15 : 16	6729	1 min.	6729	82
10	6 - 4 - 2002	15 : 17	6650	1 min.	6650	3
11	6 - 4 - 2002	15 : 19	6805	1 min.	6805	158
12	6 - 4 - 2002	15 : 20	6671	1 min.	6671	24
13	6 - 4 - 2002	15 : 21	6780	1 min.	6780	133
14	6 - 4 - 2002	15 : 23	6924	1 min.	6924	277 *
15	6 - 4 - 2002	15 : 24	6850	1 min.	6850	203
16	6 - 4 - 2002	15 : 26	6624	1 min.	6624	-23

Detector Setup 1 = Ra226, 2 = Cs137

\*= CPM exceeds 1 Sigma

\*\*= CPM exceeds 2 Sigma

\*\*\*= CPM exceeds 3 Sigma

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# Exposure Report

NWT GA00467 Hunters Point, Ca

Date 06/05/2002 Meter Serial 107447  
Location Code 821AM1A Technician Brian Cheeks  
Location Description BUILDING 821A MI RO Technician 2 N/A  
Background Data: Technician 3 N/A  
Location Code 807 Instrument Model 19  
Measurement 5  $\mu$ R/hr Cal Due Date 11/16/2002

## Sample Data:

<u>Sample Number</u>	<u>Result</u>
<u>1</u>	<u>5</u> $\mu$ R
<u>2</u>	<u>5</u> $\mu$ R
<u>3</u>	<u>6</u> $\mu$ R
<u>4</u>	<u>5</u> $\mu$ R
<u>5</u>	<u>5</u> $\mu$ R
<u>6</u>	<u>5</u> $\mu$ R
<u>7</u>	<u>5</u> $\mu$ R
<u>8</u>	<u>6</u> $\mu$ R
<u>9</u>	<u>6</u> $\mu$ R
<u>10</u>	<u>5</u> $\mu$ R
<u>11</u>	<u>5</u> $\mu$ R
<u>12</u>	<u>5</u> $\mu$ R
<u>13</u>	<u>5</u> $\mu$ R
<u>14</u>	<u>5</u> $\mu$ R
<u>15</u>	<u>5</u> $\mu$ R
<u>16</u>	<u>5</u> $\mu$ R



# Exposure Report

NWT GA00467 Hunters Point, Ca

Date 06/05/2002 Meter Serial 107447  
Location Code 821AM1B Technician Brian Cheeks  
Location Description BUILDING 821A M1 RO Technician 2 N/A  
**Background Data:** Technician 3 N/A  
Location Code 807 Instrument Model 19  
Measurement 5  $\mu$  R/hr Cal Due Date 11/16/2002

## Sample Data:

Sample Number	Result
<u>1</u>	<u>6</u> $\mu$ R
<u>2</u>	<u>6</u> $\mu$ R
<u>3</u>	<u>7</u> $\mu$ R
<u>4</u>	<u>7</u> $\mu$ R
<u>5</u>	<u>6</u> $\mu$ R
<u>6</u>	<u>7</u> $\mu$ R
<u>7</u>	<u>7</u> $\mu$ R
<u>8</u>	<u>7</u> $\mu$ R
<u>9</u>	<u>6</u> $\mu$ R
<u>10</u>	<u>6</u> $\mu$ R
<u>11</u>	<u>6</u> $\mu$ R
<u>12</u>	<u>7</u> $\mu$ R
<u>13</u>	<u>7</u> $\mu$ R
<u>14</u>	<u>6</u> $\mu$ R
<u>15</u>	<u>7</u> $\mu$ R
<u>16</u>	<u>6</u> $\mu$ R



# Swipe Data And Analysis

NWT GA00467 Hunters Point, Ca.

Location Code 821 Room 1  
Location Description 821 Room 1  
Type Counter Gas Proportional Alpha Eff 31.5  
Counter ID Protean IPC 9025 Beta/Gamma Eff 44.5  
Probe/Unit ID 23661 Alpha BKG 0.1  
Cal Date 9/12/2001 Beta/Gamma BKG 1.0  
Cal Date Due 9/12/2002  
Count Time: Sample 3  
Count Time: BKG 10

Technician Performing Count Brian Henderson Date 6/6/2002

$$\text{MDA in DPM/100cm} = \frac{2.71 + 4.65 \sqrt{\text{RB} \cdot \text{T}}}{\text{E} \cdot \text{T}}$$

T = Sample Count Time in Minutes

RB = Background Count Rate in CPM

E = Instrument Efficiency Expressed as a Decimal

Alpha MDA = 5.56

Beta MDA = 8.06

Sample Number: 1

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
α	09:27:20	0	3	0.00	0.1	-0.10	0.315	-0.32
β	09:27:20	4	3	1.33	1.0	0.33	0.445	0.75

Sample Number: 2

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
α	09:30:48	0	3	0.00	0.1	-0.10	0.315	-0.32
β	09:30:48	1	3	0.33	1.0	-0.67	0.445	-1.50

Sample Number: 3

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
α	09:34:17	0	3	0.00	0.1	-0.10	0.315	-0.32
β	09:34:17	3	3	1.00	1.0	0.00	0.445	0.00

Sample Number: 4

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
α	09:37:45	0	3	0.00	0.1	-0.10	0.315	-0.32
β	09:37:45	1	3	0.33	1.0	-0.67	0.445	-1.50

Sample Number: 5

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
α	09:41:13	0	3	0.00	0.1	-0.10	0.315	-0.32
β	09:41:13	11	3	3.67	1.0	2.67	0.445	5.99

Sample Number: 6

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
α	09:44:41	0	3	0.00	0.1	-0.10	0.315	-0.32
β	09:44:41	3	3	1.00	1.0	0.00	0.445	0.00

Sample Number: 7

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	09:48:09	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	09:48:09	2	3	0.67	1.0	-0.33	0.445	-0.75

Sample Number: 8

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	09:51:37	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	09:51:37	2	3	0.67	1.0	-0.33	0.445	-0.75

Sample Number: 9

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	09:55:05	1	3	0.33	0.1	0.23	0.315	0.74
$\beta$	09:55:05	5	3	1.67	1.0	0.67	0.445	1.50

Sample Number: 10

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	09:58:33	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	09:58:33	5	3	1.67	1.0	0.67	0.445	1.50

Sample Number: 11

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:02:01	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:02:01	3	3	1.00	1.0	0.00	0.445	0.00

Sample Number: 12

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:05:29	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:05:29	7	3	2.33	1.0	1.33	0.445	3.00

Sample Number: 13

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:08:57	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:08:57	9	3	3.00	1.0	2.00	0.445	4.49

Sample Number: 14

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:12:25	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:12:25	12	3	4.00	1.0	3.00	0.445	6.74

Sample Number: 15

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:15:54	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:15:54	4	3	1.33	1.0	0.33	0.445	0.75

Sample Number: 16

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:19:22	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:19:22	3	3	1.00	1.0	0.00	0.445	0.00

Project Supervisor Review: Daryl DeLong 6/6/2002





# Swipe Data And Analysis

NWT GA00467 Hunters Point, Ca.

Location Code 821 Room 2  
Location Description 821 Room 2  
Type Counter Gas Proportional Alpha Eff 31.5  
Counter ID Protean IPC 9025 Beta/Gamma Eff 44.5  
Probe/Unit ID 23661 Alpha BKG 0.1  
Cal Date 9/12/2001 Beta/Gamma BKG 1.0  
Cal Date Due 9/12/2002  
Count Time: Sample 3  
Count Time: BKG 10

Technician Performing Count Brian Henderson Date 6/6/2002

MDA in DPM/100cm =  $\frac{2.71 + 4.65 \sqrt{RB \cdot T}}{E \cdot T}$

T = Sample Count Time in Minutes

RB = Background Count Rate in CPM

E = Instrument Efficiency Expressed as a Decimal

Alpha MDA = 5.56

Beta MDA = 8.06

Sample Number: 1

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:22:50	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:22:50	6	3	2.00	1.0	1.00	0.445	2.25

Sample Number: 2

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:26:18	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:26:18	4	3	1.33	1.0	0.33	0.445	0.75

Sample Number: 3

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:29:47	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:29:47	1	3	0.33	1.0	-0.67	0.445	-1.50

Sample Number: 4

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:33:15	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:33:15	3	3	1.00	1.0	0.00	0.445	0.00

Sample Number: 5

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:36:43	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:36:43	4	3	1.33	1.0	0.33	0.445	0.75

Sample Number: 6

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:46:22	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:46:22	0	3	0.00	1.0	-1.00	0.445	-2.25

Sample Number: 7

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:49:50	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:49:50	0	3	0.00	1.0	-1.00	0.445	-2.25

Sample Number: 8

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:53:19	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:53:19	7	3	2.33	1.0	1.33	0.445	3.00

Sample Number: 9

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	10:56:47	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	10:56:47	4	3	1.33	1.0	0.33	0.445	0.75

Sample Number: 10

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	11:00:15	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	11:00:15	8	3	2.67	1.0	1.67	0.445	3.75

Sample Number: 11

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	11:03:43	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	11:03:43	0	3	0.00	1.0	-1.00	0.445	-2.25

Sample Number: 12

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	11:07:11	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	11:07:11	0	3	0.00	1.0	-1.00	0.445	-2.25

Sample Number: 13

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	11:10:39	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	11:10:39	2	3	0.67	1.0	-0.33	0.445	-0.75

Sample Number: 14

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	11:14:07	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	11:14:07	10	3	3.33	1.0	2.33	0.445	5.24

Sample Number: 15

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	11:17:35	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	11:17:35	2	3	0.67	1.0	-0.33	0.445	-0.75

Sample Number: 16

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	11:21:04	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	11:21:04	2	3	0.67	1.0	-0.33	0.445	-0.75

Project Supervisor Review: Daryl DeLong 6/6/2002



# Swipe Data And Analysis

NWT GA00467 Hunters Point, Ca.

Location Code 821 Drain  
Location Description Building 821 Drain  
Type Counter Gas Proportional  
Counter ID Protean IPC 9025  
Probe/Unit ID 23661  
Cal Date 9/12/2001  
Cal Date Due 9/12/2002  
Count Time: Sample 3  
Count Time: BKG 10

Alpha Eff 31.5  
Beta/Gamma Eff 44.5  
Alpha BKG 0.1  
Beta/Gamma BKG 1.0

Technician Performing Count Brian Henderson Date 6/6/2002

MDA in DPM/100cm =  $\frac{2.71 + 4.65 \sqrt{RB \cdot T}}{E \cdot T}$

T = Sample Count Time in Minutes

RB = Background Count Rate in CPM

E = Instrument Efficiency Expressed as a Decimal

Alpha MDA = 5.56

Beta MDA = 8.06

Sample Number: 1

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	09:03:04	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	09:03:04	5	3	1.67	1.0	0.67	0.445	1.50

Sample Number: 2

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	09:06:32	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	09:06:32	2	3	0.67	1.0	-0.33	0.445	-0.75

Sample Number: 3

	Time	Counts	Count Time	CPM	BKG CPM	Net CPM	EFF	Net DPM
$\alpha$	09:10:00	0	3	0.00	0.1	-0.10	0.315	-0.32
$\beta$	09:10:00	3	3	1.00	1.0	0.00	0.445	0.00

Project Supervisor Review: Daryl DeLong 6/6/2002



# Gamma Spectroscopy Results

Sample results given in (pCi/g)

NWT GA00467 Hunters Point, Ca.

Ufo ID	Sample Description			
N4670957	821 S-1 - 124g 5/17/02 07:10			
Dry Weight (g)	Time Counted (s)	Operator	Date Acquired	Time Acquired
124	1800	Brian Henderson	28-May-02	12:36:03 PM
Library Path				Date Sampled
Hunter Point.Lib				17-May-02
			Time Sampled	7:10:00 AM

Nuclide	Net Activity	MDA	Uncertainty	Soil DCGL
AC-228	*<MDA	1.2010E-01	**	*NA
Am-241	*<MDA	3.0208E-01	**	7.8000E+00
BI-212	*<MDA	4.5677E-01	**	*NA
BI-214	*<MDA	2.1406E-01	**	*NA
Co-60	*<MDA	4.6513E-02	**	4.2000E-01
CS-137	2.2417E-01	4.5672E-02	1.3349E-01	1.3000E-01
Eu-152	*<MDA	3.9495E-01	**	1.3000E-01
Eu-154	*<MDA	2.2181E-01	**	2.3000E-01
K-40	1.0653E+01	1.7594E+00	4.0393E+00	*NA
PA-234	*<MDA	1.9461E-01	**	*NA
PB-212	*<MDA	1.3892E-01	**	*NA
PB-214	*<MDA	1.5621E-01	**	*NA
Ra-226	3.7631E+00	1.8125E+00	3.0089E+00	*NA *BKG
TH-234	*<MDA	2.7681E+00	**	*NA
TL-208	2.3419E-01	8.0873E-02	1.2542E-01	*NA
U-235	*<MDA	9.8888E-01	**	5.7000E-01

\*<MDA = Activity for this Nuclide is less than the Minimum Detectable Activity (MDA)

\*\* = Activity for this Nuclide is less than the MDA, therefore no Uncertainty is necessary

\*BKG= Background is either naturally occurring (nonanthropogenic) or ambient (anthropogenic) conditions that are unrelated to Navy activity or operations. Background levels are currently under development for specific media such as soil, concrete structures, wood structures, asphalt pavement, and concrete pavement.

\*NA = No DCGL available for this Nuclide



# Gamma Spectroscopy Results

Sample results given in (pCi/g)

NWT GA00467 Hunters Point, Ca.

Ufo ID	Sample Description			
N4670958	821 S-2 - 406g 5/17/02 07:20			
Dry Weight (g)	Time Counted (s)	Operator	Date Acquired	Time Acquired
406	1800	Brian Henderson	28-May-02	1:15:36 PM
Library Path			Date Sampled	Time Sampled
Hunter Point.Lib			17-May-02	7:20:00 AM

Nuclide	Net Activity	MDA	Uncertainty	Soil DCGL
AC-228	*<MDA	3.6681E-02	**	*NA
Am-241	*<MDA	8.7615E-02	**	7.8000E+00
BI-212	*<MDA	2.3030E-01	**	*NA
BI-214	*<MDA	3.5547E-02	**	*NA
Co-60	*<MDA	1.9406E-02	**	4.2000E-01
CS-137	*<MDA	4.4959E-02	**	1.3000E-01
Eu-152	*<MDA	8.8303E-02	**	1.3000E-01
Eu-154	*<MDA	9.5197E-02	**	2.3000E-01
K-40	1.3048E+01	1.1989E+00	2.6532E+00	*NA
PA-234	*<MDA	9.5941E-02	**	*NA
PB-212	*<MDA	5.9122E-02	**	*NA
PB-214	*<MDA	6.8937E-02	**	*NA
Ra-226	2.0358E+00	8.0774E-01	1.3370E+00	*NA *BKG
TH-234	*<MDA	1.4410E+00	**	*NA
TL-208	3.2929E-01	2.4700E-02	9.0138E-02	*NA
U-235	*<MDA	5.7762E-01	**	5.7000E-01

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\*NA = No DCGL available for this Nuclide

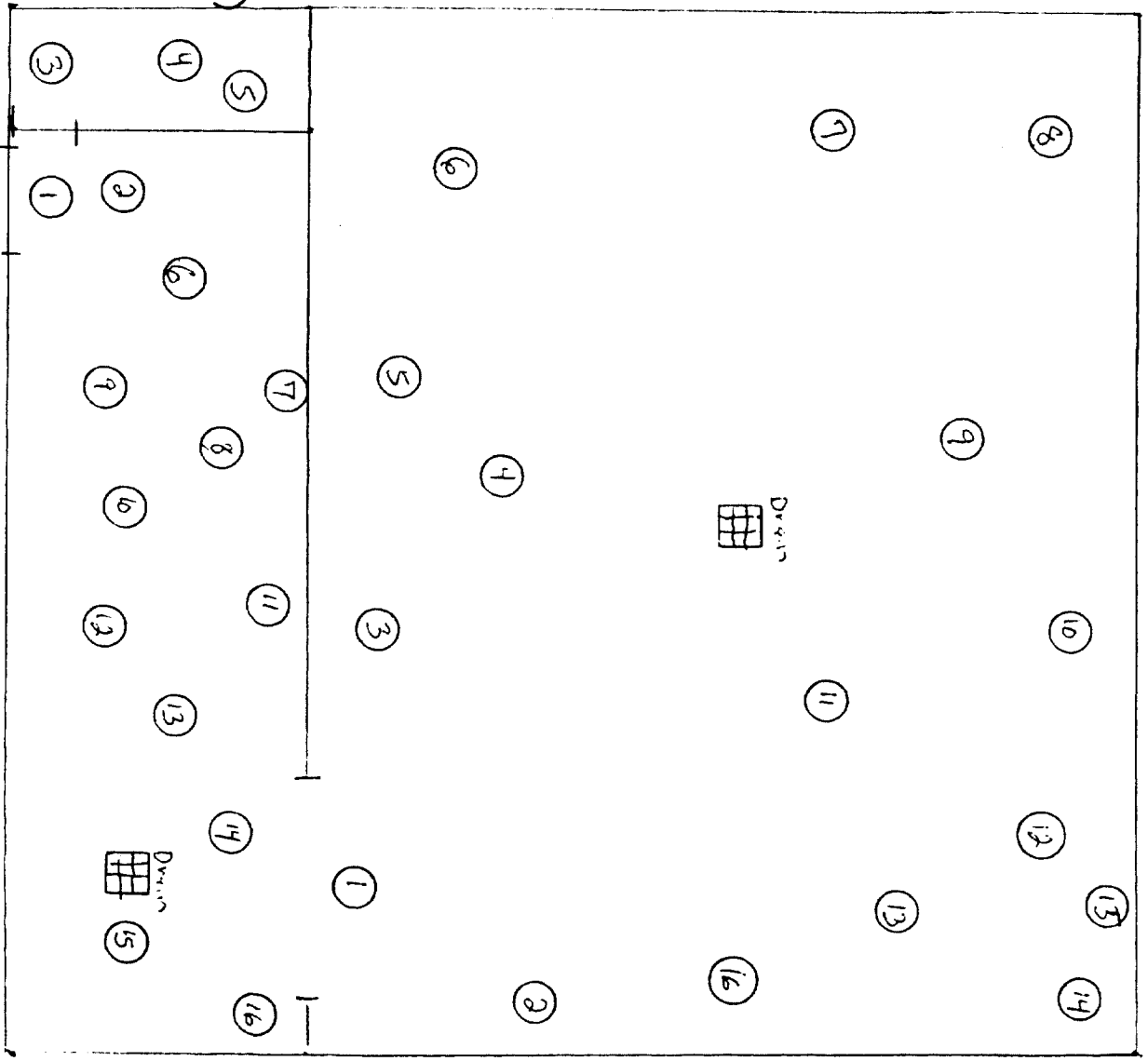
# Gamma QA Report

**02-06003**

InternalID	InternalWorkOrder	AnalysisCode	Isotope	SampleType	ClientID	ReportUnits	Result	Uncertainty	MDA
02-06003-04	02-06003	Gamma	AM-241	DO	821 S-1	pCi/g	1.48E-02	3.04E-02	4.55E-02
02-06003-04	02-06003	Gamma	CO-60	DO	821 S-1	pCi/g	-2.64E-04	2.13E-02	3.62E-02
02-06003-04	02-06003	Gamma	CS-137	DO	821 S-1	pCi/g	7.75E-02	3.61E-02	3.22E-02
02-06003-04	02-06003	Gamma	EU-152	DO	821 S-1	pCi/g	-1.95E-02	1.23E-01	2.08E-01
02-06003-04	02-06003	Gamma	EU-154	DO	821 S-1	pCi/g	-1.81E-02	5.80E-02	9.67E-02
02-06003-04	02-06003	Gamma	RA-226	DO	821 S-1	pCi/g	3.54E-01	8.29E-02	6.03E-02
02-06003-04	02-06003	Gamma	TH-232	DO	821 S-1	pCi/g	3.51E-01	1.10E-01	1.33E-01
02-06003-04	02-06003	Gamma	U-235	DO	821 S-1	pCi/g	1.34E-01	2.07E-01	1.70E-01
02-06003-03	02-06003	Gamma	AM-241	DUP	821 S-1	pCi/g	3.63E-02	3.06E-02	4.64E-02
02-06003-03	02-06003	Gamma	CO-60	DUP	821 S-1	pCi/g	1.29E-02	2.03E-02	3.60E-02
02-06003-03	02-06003	Gamma	CS-137	DUP	821 S-1	pCi/g	8.03E-02	3.50E-02	3.09E-02
02-06003-03	02-06003	Gamma	EU-152	DUP	821 S-1	pCi/g	-4.70E-02	1.20E-01	1.98E-01
02-06003-03	02-06003	Gamma	EU-154	DUP	821 S-1	pCi/g	-1.99E-02	6.15E-02	9.06E-02
02-06003-03	02-06003	Gamma	RA-226	DUP	821 S-1	pCi/g	4.07E-01	7.59E-02	6.19E-02
02-06003-03	02-06003	Gamma	TH-232	DUP	821 S-1	pCi/g	2.85E-01	7.50E-02	8.31E-02
02-06003-03	02-06003	Gamma	U-235	DUP	821 S-1	pCi/g	4.74E-02	2.69E-01	1.62E-01

BLOG #881

Room B (2)



Room A (1)

